

WHAT IS CLAIMED IS:

1        1. Method for providing a sensor system in a communication device  
2 comprising the steps of:

3                providing an electromechanical dielectric (EMD) film integral with  
4 the surface of the cover of the communication device;

5                providing one or more voided areas in the outer surface regions in the  
6 cover for accessing the EMD film wherein the voided area corresponds to  
7 the operational function to be implemented; and

8                coupling the EMD film in each of the exposed regions to electronic  
9 circuit means associated with the corresponding operational function of the  
10 communication device.

1        2. The method as defined in claim 1, wherein the step of providing one  
2 or more voided areas in the outer surface region includes providing one or  
3 more voided areas in the inner surface region of the cover in those areas  
4 where the EMD film requires unobstructed movement to perform the desired  
5 operational function of transforming an acoustic energy signal to a  
6 corresponding electrical signal and transforming an electrical signal to a  
7 corresponding acoustic signal.

1        3. The method as defined in claim 1, further including the step of  
2 providing a display in one of the voided areas with the rear surface of the  
3 display facing and in contact with the EMD film.

1        4. The method as defined in claim 1, wherein the step of providing the  
2 EMD film integral with the surface of the cover includes the step of injection  
3 molding the cover with the EMD film.

1           5.     A communication device comprising:  
2                 an electromechanical dielectric (EMD) film coextensive with at least  
3                 a portion of the surface of a cover of the communication device;  
4                 one or more voided areas in the outer surface regions in the cover for  
5                 accessing a portion of the EMD film wherein a given voided area in the  
6                 surface of the cover corresponds to the operational function to be  
7                 implemented;  
8                 electronic circuit means coupled to the EMD film for sensing  
9                 electrical signals generated by the EMD film in response to exposure to a  
10                force and for displacing the surface of the EMD film with respect to a plane  
11                passing through and coextensive with the surface in response to electrical  
12                signals generated by the electronic circuit means.

1           6.     A communication device as defined in claim 5, wherein the EMD  
2                 film functions as a speaker.

1           7.     A communication device as defined in claim 5, wherein the EMD  
2                 film functions as a microphone.

1           8.     A communication device as defined in claim 5, wherein the EMD  
2                 film functions as a keypad.

1           9.     A communication device as defined in claim 5, further comprising a  
2                 display in contact with the EMD film whereby the EMD film is responsive  
3                 to sensing a direction of touching on the surface of the display.

1        10. A portable, handheld communication device of the type having means  
2        for establishing a communication link between itself and a remote  
3        communication device comprising:

4                a case having at least a first portion molded from material responsive  
5        to displacement for generating an electric signal; and

6                at least a second portion molded from material responsive to electric  
7        signals for displacement of said material proportional to the magnitude of the  
8        electrical signal.

1        11. A portable, handheld communication device as defined in claim 10,  
2        wherein said first portion and said second portion are molded from  
3        electromechanical dielectric (EMD) film, said EMD film being coextensive  
4        with at least a portion of the surface of said case.

1        12. A portable, handheld communication device as defined in claim 11  
2        further including security means for controlling access to said device and  
3        limiting call completion to an authorized user.

1        13. A portable, handheld communication device as defined in claim 12  
2        wherein said security means further includes at least a portion of said EMD  
3        film configured as a fingerprint recognition sensor

1        14. A method for providing a touch-sensitive surface functionality in a  
2        communication device comprising the steps of:

3                providing an electromechanical dielectric (EMD) film with a first  
4        major surface having adhesion properties;

5                placing said first adhesion major surface in contact with a desired  
6        location of a surface of the communication device; and

7           coupling the EMD film to electronic circuit means associated with the  
8           corresponding operational function of the communication device.

1           15.    The method as defined in claim 14, further including the steps of:  
2                providing an EMD film with a second major surface disposed  
3                opposite said first major surface, said second major surface having adhesion  
4                properties; and  
5                locating the EMD film between the cover of the device and a display  
6                screen of the device, whereby the EMD film holds the display in place to  
7                provide a touch-sensitive screen.

1           16.    The method as defined in claim 14, further including the steps of:  
2                providing an EMD film with a second major surface disposed  
3                opposite said first major surface;  
4                providing a flexible protective layer on said second major surface;  
5                and  
6                attaching the adhesion major surface of the EMD film to a desired  
7                location on the surface of the device, whereby the protective layer faces  
8                outward for touching contact by a user.

1           17.    A communication device having touch-sensitive surface functionality  
2                comprising:  
3                an electromechanical dielectric (EMD) film with a first major surface  
4                having adhesion properties and a second major surface oppositely disposed  
5                said first major surface, whereby said adhesion major surface holds said  
6                EMD film in contact with a desired location on the surface of the  
7                communication device; and

8 means for coupling said EMD film to electronic circuit means  
9 associated with the corresponding operational function of the communication  
10 device.

1 18. A communication device as defined in claim 17, further comprising:  
2 said EMD film second major surface having adhesion properties; and  
3 a display in contact with and held by said EMD film second major  
4 surface.

1 19. A communication device as defined in claim 17, further comprising a  
2 said EMD film second major surface having a flexible protective layer.